<110> Mello, Craig C.
      Tabara, Hiroaki
      Grishok, Alla
      Fire, Andrew

<120> RNA INTERFERENCE PATHWAY GENES AS TOOLS FOR TARGETED GENETIC
      INTERFERENCE

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Phe Tyr Arg His Ser Leu Asp Pro Glu Met Lys Trp Leu Ala Arg Pro
             15                  20                  25


act ggt aaa tgc gac ggc aaa ttc tat gag aag aaa gta ctt ctt ttg         149
Thr Gly Lys Cys Asp Gly Lys Phe Tyr Glu Lys Lys Val Leu Leu Leu
         30                  35                  40


gta aat tgg ttc aag ttc tcc agc aaa att tac gat cgg gaa tac tac         197
Val Asn Trp Phe Lys Phe Ser Ser Lys Ile Tyr Asp Arg Glu Tyr Tyr
     45                  50                  55


gag tat gaa gtg aaa atg aca aag gaa gta ttg aat aga aaa cca gga         245
Glu Tyr Glu Val Lys Met Thr Lys Glu Val Leu Asn Arg Lys Pro Gly
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ctc ttc tgg caa cat ctt cgg cat gag aag aag cag aca gat ttt att    341
Leu Phe Trp Gln His Leu Arg His Glu Lys Lys Gln Thr Asp Phe Ile
            95                  100                 105

ctc gaa gac tat gtt ttt gat gaa aag gac act gtt tat agt gtt tgt    389
Leu Glu Asp Tyr Val Phe Asp Glu Lys Asp Thr Val Tyr Ser Val Cys
        110                 115                 120

cga ctg aac act gtc aca tca aaa atg ctg gtt tcg gag aaa gta gta    437
Arg Leu Asn Thr Val Thr Ser Lys Met Leu Val Ser Glu Lys Val Val
    125                 130                 135

aaa aag gat tcg gag aaa aaa gat gaa aag gat ttg gag aaa aaa atc    485
Lys Lys Asp Ser Glu Lys Lys Asp Glu Lys Asp Leu Glu Lys Lys Ile
140                 145                 150                 155

tta tac aca atg ata ctt acc tat cgt aaa aaa ttt cac ctg aac ttt    533
Leu Tyr Thr Met Ile Leu Thr Tyr Arg Lys Lys Phe His Leu Asn Phe
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agt cga gaa aat ccg gaa aaa gac gaa gaa gcg aat cgg agt tac aaa    581
Ser Arg Glu Asn Pro Glu Lys Asp Glu Glu Ala Asn Arg Ser Tyr Lys
            175                 180                 185

ttc ctg aag aat gtt atg acc cag aaa gtt cgc tac gcg cct ttt gtg    629
Phe Leu Lys Asn Val Met Thr Gln Lys Val Arg Tyr Ala Pro Phe Val
        190                 195                 200

aac gag gag att aaa gta caa ttc gcg aaa aat ttt gtg tac gat aat    677
Asn Glu Glu Ile Lys Val Gln Phe Ala Lys Asn Phe Val Tyr Asp Asn
        205                 210                 215

aat tca att ctg cga gtt cct gaa tcg ttt cac gat cca aac aga ttc    725
Asn Ser Ile Leu Arg Val Pro Glu Ser Phe His Asp Pro Asn Arg Phe
220                 225                 230                 235

gaa caa tca tta gaa gta gca cca aga atc gaa gca tgg ttt gga att    773
Glu Gln Ser Leu Glu Val Ala Pro Arg Ile Glu Ala Trp Phe Gly Ile
                240                 245                 250

tac att gga atc aaa gaa ttg ttc gat ggt gaa cct gtg ctc aat ttt    821
Tyr Ile Gly Ile Lys Glu Leu Phe Asp Gly Glu Pro Val Leu Asn Phe
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gca att gtc gat aaa cta ttc tac aat gca ccg aaa atg tct ctt ctg    869
Ala Ile Val Asp Lys Leu Phe Tyr Asn Ala Pro Lys Met Ser Leu Leu
        270                 275                 280

gat tat ctt ctc cta att gtc gac ccc cag tcg tgt aac gat gat gta    917
Asp Tyr Leu Leu Leu Ile Val Asp Pro Gln Ser Cys Asn Asp Asp Val
        285                 290                 295

cga aaa gat ctt aaa aca aaa ctg atg gcg gga aaa atg aca atc aga    965
Arg Lys Asp Leu Lys Thr Lys Leu Met Ala Gly Lys Met Thr Ile Arg
300                 305                 310                 315
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3

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caa gcc gcg cgg cca aga att cga caa tta ttg gaa aat ttg aag ctg        1013
Gln Ala Ala Arg Pro Arg Ile Arg Gln Leu Leu Glu Asn Leu Lys Leu
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aaa tgc gca gaa gtt tgg gat aac gaa atg tcg aga ttg aca gaa cga        1061
Lys Cys Ala Glu Val Trp Asp Asn Glu Met Ser Arg Leu Thr Glu Arg
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cat ctg aca ttt cta gat ttg tgc gag gaa aac tct ctt gtt tat aaa        1109
His Leu Thr Phe Leu Asp Leu Cys Glu Glu Asn Ser Leu Val Tyr Lys
            350                 355                 360

gtc act ggt aaa tcg gac aga gga aga aat gca aaa aag tac gat act        1157
Val Thr Gly Lys Ser Asp Arg Gly Arg Asn Ala Lys Lys Tyr Asp Thr
            365                 370                 375

aca ttg ttc aaa atc tat gag gaa aac aaa aag ttc att gag ttt ccc        1205
Thr Leu Phe Lys Ile Tyr Glu Glu Asn Lys Lys Phe Ile Glu Phe Pro
380                 385                 390                 395

cac cta cca cta gtc aaa gtt aaa agt gga gca aaa gaa tac gct gta        1253
His Leu Pro Leu Val Lys Val Lys Ser Gly Ala Lys Glu Tyr Ala Val
            400                 405                 410

cca atg gaa cat ctt gaa gtt cat gag aag cca caa aga tac aag aat        1301
Pro Met Glu His Leu Glu Val His Glu Lys Pro Gln Arg Tyr Lys Asn
            415                 420                 425

cga att gat ctg gtg atg caa gac aag ttt cta aag cga gct aca cga        1349
Arg Ile Asp Leu Val Met Gln Asp Lys Phe Leu Lys Arg Ala Thr Arg
            430                 435                 440

aaa cct cac gac tac aaa gaa aat acc cta aaa atg ctg aaa gaa ttg        1397
Lys Pro His Asp Tyr Lys Glu Asn Thr Leu Lys Met Leu Lys Glu Leu
445                 450                 455

gat ttc tct tct gaa gag cta aat ttt gtt gaa aga ttt gga tta tgc        1445
Asp Phe Ser Ser Glu Glu Leu Asn Phe Val Glu Arg Phe Gly Leu Cys
460                 465                 470                 475

tcc aaa ctt cag atg atc gaa tgt cca gga aag gtt ttg aaa gag cca        1493
Ser Lys Leu Gln Met Ile Glu Cys Pro Gly Lys Val Leu Lys Glu Pro
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atg ctt gtg aat agt gta aat gaa caa att aaa atg aca cca gtg att        1541
Met Leu Val Asn Ser Val Asn Glu Gln Ile Lys Met Thr Pro Val Ile
            495                 500                 505

cgt gga ttt caa gaa aaa caa ttg aat gtg gtt ccc gaa aaa gaa ctt        1589
Arg Gly Phe Gln Glu Lys Gln Leu Asn Val Val Pro Glu Lys Glu Leu
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tgc tgt gct gtt ttt gta gtc aac gaa aca gcg gga aat cca tgc tta        1637
Cys Cys Ala Val Phe Val Val Asn Glu Thr Ala Gly Asn Pro Cys Leu
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gaa gag aac gac gtt gtt aag ttc tac acc gaa cta att ggt ggt tgc        1685
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4

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tct att atg tac gac gcg acg aaa aat gaa tat gcc ttc tac aaa aat     1781
Ser Ile Met Tyr Asp Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys Asn
            575             580             585

tgt aca cta aat acc gga atc ggt aga ttt gaa ata gcc gca aca gaa     1829
Cys Thr Leu Asn Thr Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr Glu
            590             595             600

gcg aag aat atg ttt gaa cgt ctt ccc gat aaa gaa caa aaa gtc tta     1877
Ala Lys Asn Met Phe Glu Arg Leu Pro Asp Lys Glu Gln Lys Val Leu
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atg ttc att atc att tcc aaa cga caa ctg aat gct tac ggt ttt gtg     1925
Met Phe Ile Ile Ile Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe Val
620             625             630             635

aaa cat tat tgc gat cac acc atc ggt gta gct aat cag cat att act     1973
Lys His Tyr Cys Asp His Thr Ile Gly Val Ala Asn Gln His Ile Thr
            640             645             650

tct gaa aca gtc aca aaa gct ttg gca tca cta agg cac gag aaa gga     2021
Ser Glu Thr Val Thr Lys Ala Leu Ala Ser Leu Arg His Glu Lys Gly
            655             660             665

tca aaa cga att ttc tat caa att gca ttg aaa atc aac gcg aaa tta     2069
Ser Lys Arg Ile Phe Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys Leu
            670             675             680

gga ggt att aac cag gag ctt gac tgg tca gaa att gca gaa ata tca     2117
Gly Gly Ile Asn Gln Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile Ser
            685             690             695

cca gaa gaa aaa gaa aga cgg aaa aca atg cca tta act atg tat gtt     2165
Pro Glu Glu Lys Glu Arg Arg Lys Thr Met Pro Leu Thr Met Tyr Val
700             705             710             715

gga att gat gta act cat cca acc tcc tac agt gga att gat tat tct     2213
Gly Ile Asp Val Thr His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr Ser
            720             725             730

ata gcg gct gta gta gcg agt atc aat cca ggt gga act atc tat cga     2261
Ile Ala Ala Val Val Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr Arg
            735             740             745

aat atg att gtg act caa gaa gaa tgt cgt ccc ggt gag cgt gca gtg     2309
Asn Met Ile Val Thr Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala Val
            750             755             760

gct cat gga cgg gaa aga aca gat att ttg gaa gca aag ttc gtg aaa     2357
Ala His Gly Arg Glu Arg Thr Asp Ile Leu Glu Ala Lys Phe Val Lys
            765             770             775

ttg ctc aga gaa ttc gca gaa aac aac gac aat cga gca cca gcg cat     2405
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780             785             790             795

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Ser His Asp Glu Leu Arg Ser Leu Lys Ser Glu Val Lys Gln Phe Met
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tcg gaa cgg gat gga gaa gat cca gag ccg aag tac acg ttc att gtg        2549
Ser Glu Arg Asp Gly Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile Val
            830              .  835                 840

att cag aaa aga cac aat aca cga ttg ctt cga aga atg gaa aaa gat        2597
Ile Gln Lys Arg His Asn Thr Arg Leu Leu Arg Arg Met Glu Lys Asp
            845                 850                 855

aag cca gtg gtc aat aaa gat ctt act cct gct gaa aca gat gtc gct        2645
Lys Pro Val Val Asn Lys Asp Leu Thr Pro Ala Glu Thr Asp Val Ala
860                 865                 870                 875

gtt gct gct gtt aaa caa tgg gag gag gat atg aaa gaa agc aaa gaa        2693
Val Ala Ala Val Lys Gln Trp Glu Glu Asp Met Lys Glu Ser Lys Glu
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act gga att gtg aac cca tca tcc gga aca act gtg gat aaa ctt atc        2741
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Val Ser Lys Tyr Lys Phe Asp Phe Phe Leu Ala Ser His His Gly Val
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ctt ggt aca tct cgt cca gga cat tac act gtt atg tat gac gat aaa        2837
Leu Gly Thr Ser Arg Pro Gly His Tyr Thr Val Met Tyr Asp Asp Lys
            925                 930                 935

gga atg agc caa gat gaa gtc tat aaa atg acc tac gga ctt gct ttt        2885
Gly Met Ser Gln Asp Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala Phe
940                 945                 950                 955

ctc tct gct aga tgt cga aaa ccc atc tcg ttg cct gtt ccg gtt cat        2933
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tat gct cat tta tca tgt gaa aaa gcg aaa gag ctt tat cga act tac        2981
Tyr Ala His Leu Ser Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr Tyr
            975                 980                 985

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Lys Glu His Tyr Ile Gly Asp Tyr Ala Gln Pro Arg Thr Arg His Glu
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gca taacattttg caaaagtgtc gcccgtttca atcaaatttt tcaattgtag            3130
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Met	Thr	Lys	Glu	Val	Leu	Asn	Arg	Lys	Pro	Gly	Lys	Pro	Phe	Pro	Lys
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Lys	Lys	Asp	Glu	Lys	Asp	Leu	Glu	Lys	Lys	Ile	Leu	Tyr	Thr	Met	Ile
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Leu	Thr	Tyr	Arg	Lys	Lys	Phe	His	Leu	Asn	Phe	Ser	Arg	Glu	Asn	Pro
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Glu	Lys	Asp	Glu	Glu	Ala	Asn	Arg	Ser	Tyr	Lys	Phe	Leu	Lys	Asn	Val
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Met	Thr	Gln	Lys	Val	Arg	Tyr	Ala	Pro	Phe	Val	Asn	Glu	Glu	Ile	Lys
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Val	Gln	Phe	Ala	Lys	Asn	Phe	Val	Tyr	Asp	Asn	Asn	Ser	Ile	Leu	Arg
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Val	Pro	Glu	Ser	Phe	His	Asp	Pro	Asn	Arg	Phe	Glu	Gln	Ser	Leu	Glu
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Val	Ala	Pro	Arg	Ile	Glu	Ala	Trp	Phe	Gly	Ile	Tyr	Ile	Gly	Ile	Lys
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Glu	Leu	Phe	Asp	Gly	Glu	Pro	Val	Leu	Asn	Phe	Ala	Ile	Val	Asp	Lys
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Leu	Phe	Tyr	Asn	Ala	Pro	Lys	Met	Ser	Leu	Leu	Asp	Tyr	Leu	Leu	Leu
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Ile	Val	Asp	Pro	Gln	Ser	Cys	Asn	Asp	Asp	Val	Arg	Lys	Asp	Leu	Lys
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Arg	Ile	Arg	Gln	Leu	Leu	Glu	Asn	Leu	Lys	Leu	Lys	Cys	Ala	Glu	Val
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Trp	Asp	Asn	Glu	Met	Ser	Arg	Leu	Thr	Glu	Arg	His	Leu	Thr	Phe	Leu
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Asp	Arg	Gly	Arg	Asn	Ala	Lys	Lys	Tyr	Asp	Thr	Thr	Leu	Phe	Lys	Ile
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Tyr	Glu	Glu	Asn	Lys	Lys	Phe	Ile	Glu	Phe	Pro	His	Leu	Pro	Leu	Val
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Lys	Val	Lys	Ser	Gly	Ala	Lys	Glu	Tyr	Ala	Val	Pro	Met	Glu	His	Leu
			405					410					415		

Glu	Val	His	Glu	Lys	Pro	Gln	Arg	Tyr	Lys	Asn	Arg	Ile	Asp	Leu	Val

```
                420                      425                       430
Met Gln Asp Lys Phe Leu Lys Arg Ala Thr Arg Lys Pro His Asp Tyr
        435                      440                      445
Lys Glu Asn Thr Leu Lys Met Leu Lys Glu Leu Asp Phe Ser Ser Glu
    450                      455                      460
Glu Leu Asn Phe Val Glu Arg Phe Gly Leu Cys Ser Lys Leu Gln Met
465                      470                      475                      480
Ile Glu Cys Pro Gly Lys Val Leu Lys Glu Pro Met Leu Val Asn Ser
                485                      490                      495
Val Asn Glu Gln Ile Lys Met Thr Pro Val Ile Arg Gly Phe Gln Glu
                500                      505                      510
Lys Gln Leu Asn Val Val Pro Glu Lys Glu Leu Cys Cys Ala Val Phe
            515                      520                      525
Val Val Asn Glu Thr Ala Gly Asn Pro Cys Leu Glu Glu Asn Asp Val
    530                      535                      540
Val Lys Phe Tyr Thr Glu Leu Ile Gly Gly Cys Lys Phe Arg Gly Ile
545                      550                      555                      560
Arg Ile Gly Ala Asn Glu Asn Arg Gly Ala Gln Ser Ile Met Tyr Asp
                565                      570                      575
Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys Asn Cys Thr Leu Asn Thr
                580                      585                      590
Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr Glu Ala Lys Asn Met Phe
            595                      600                      605
Glu Arg Leu Pro Asp Lys Glu Gln Lys Val Leu Met Phe Ile Ile Ile
    610                      615                      620
Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe Val Lys His Tyr Cys Asp
625                      630                      635                      640
His Thr Ile Gly Val Ala Asn Gln His Ile Thr Ser Glu Thr Val Thr
                645                      650                      655
Lys Ala Leu Ala Ser Leu Arg His Glu Lys Gly Ser Lys Arg Ile Phe
                660                      665                      670
Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys Leu Gly Gly Ile Asn Gln
            675                      680                      685
Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile Ser Pro Glu Glu Lys Glu
    690                      695                      700
Arg Arg Lys Thr Met Pro Leu Thr Met Tyr Val Gly Ile Asp Val Thr
705                      710                      715                      720
His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr Ser Ile Ala Ala Val Val
                725                      730                      735
Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr Arg Asn Met Ile Val Thr
            740                      745                      750
Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala Val Ala His Gly Arg Glu
            755                      760                      765
Arg Thr Asp Ile Leu Glu Ala Lys Phe Val Lys Leu Leu Arg Glu Phe
    770                      775                      780
Ala Glu Asn Asn Asp Asn Arg Ala Pro Ala His Ile Val Val Tyr Arg
785                      790                      795                      800
Asp Gly Val Ser Asp Ser Glu Met Leu Arg Val Ser His Asp Glu Leu
                805                      810                      815
Arg Ser Leu Lys Ser Glu Val Lys Gln Phe Met Ser Glu Arg Asp Gly
            820                      825                      830
Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile Val Ile Gln Lys Arg His
        835                      840                      845
Asn Thr Arg Leu Leu Arg Arg Met Glu Lys Asp Lys Pro Val Val Asn
    850                      855                      860
Lys Asp Leu Thr Pro Ala Glu Thr Asp Val Ala Val Ala Ala Val Lys
865                      870                      875                      880
Gln Trp Glu Glu Asp Met Lys Glu Ser Lys Glu Thr Gly Ile Val Asn
                885                      890                      895
Pro Ser Ser Gly Thr Thr Val Asp Lys Leu Ile Val Ser Lys Tyr Lys
            900                      905                      910
```

8

```
Phe Asp Phe Phe Leu Ala Ser His His Gly Val Leu Gly Thr Ser Arg
    915                 920             925
Pro Gly His Tyr Thr Val Met Tyr Asp Asp Lys Gly Met Ser Gln Asp
    930             935             940
Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala Phe Leu Ser Ala Arg Cys
945             950             955             960
Arg Lys Pro Ile Ser Leu Pro Val Pro Val His Tyr Ala His Leu Ser
            965             970             975
Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr Tyr Lys Glu His Tyr Ile
            980             985             990
Gly Asp Tyr Ala Gln Pro Arg Thr Arg His Glu Met Glu His Phe Leu
        995             1000            1005
Gln Thr Asn Val Lys Tyr Pro Gly Met Ser Phe Ala
    1010            1015            1020
```

<210> 4
<211> 1222
<212> DNA
<213> Caenorhabditis elegans

<400> 4
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atggatttaa ccaaactaac gtttgaaagc gttttcggtg gatcagatgt tcctatgaag    60
ccttcccgat cggaggataa caaaacgcca agaaacagaa cagatttgga gatgtttctg   120
aagaaaactc ccctcatggt actagaagag ctgctaagg ctgtctatca aaagacgcca   180
acttggggca ctgtcgaact tcctgaaggc ttcgagatga cgttgattct gaatgaaatt   240
actgtaaaag gccaggcaac aagcaagaaa gctgcgagac aaaaggctgc tgttgaatat   300
ttacgcaagg ttgtggagaa aggaaagcac gaaatctttt tcattcctgg aacaaccaaa   360
gaagaagctc tttcgaatat tgatcaaata tcggataagg ctgaggaatt gaaacgatca   420
acttcagatg ctgttcagga taacgataac gatgattcga ttcctacaag tgctgaattt   480
ccacctggta tttcgccaac cgagaattgg gtcggaaagt tgcaggaaaa atctcaaaaa   540
agcaagctgc aagcccccaat ctatgaagat tccaagaatg agagaaccga gcgtttcttg   600
gttatatgca cgatgtgcaa tcaaaaaacc agaggaatca gaagtaagaa gaaggacgca   660
aagaatcttg cagcatggtt gatgtggaaa gcgttggaag acggtatcga atctctggaa   720
tcatatgata tggttgatgt gattgaaaat ttggaagaag ctgaacattt actcgaaatt   780
caggatcaag catccaagat taaagacaag cattccgcac tgattgatat actctcggac   840
aagaaaagat tttcagacta cagcatggat ttcaacgtat tatcagtgag cacaatggga   900
atacatcagg tgctattgga aatctcgttc cggcgtctag tttctccaga ccccgacgat   960
ttggaaatgg gagcagaaca cacccagact gaagaaatta tgaaggctac tgccgagaag  1020
gaaaagctac ggaagaagaa tatgccagat tccgggccgc tagtgtttgc tggacatggt  1080
tcatcggcgg aagaggctaa acagtgtgct tgtaaatcgg cgattatcca tttcaacacc  1140
tatgatttca cggattgaaa atattattgc gtattcctga aaaatgaagc gtctgaatga  1200
ttataaaaaa aaaaaaaaaa aa                                           1222
```

<210> 5
<211> 407
<212> PRT
<213> Caenorhabditis elegans

<220>
<221> VARIANT
<222> (1)...(407)
<223> Xaa = Any Amino Acid

<400> 5
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Met Asp Leu Thr Lys Leu Thr Phe Glu Ser Val Phe Gly Gly Ser Asp
1               5                   10                  15
Val Pro Met Lys Pro Ser Arg Ser Glu Asp Asn Lys Thr Pro Arg Asn
            20                  25                  30
Arg Thr Asp Leu Glu Met Phe Leu Lys Lys Thr Pro Leu Met Val Leu
        35                  40                  45
Glu Glu Ala Ala Lys Ala Val Tyr Gln Lys Thr Pro Thr Trp Gly Thr
```

9

```
                50                          55                          60
Val Glu Leu Pro Glu Gly Phe Glu Met Thr Leu Ile Leu Asn Glu Ile
 65                      70                      75                      80
Thr Val Lys Gly Gln Ala Thr Ser Lys Lys Ala Ala Arg Gln Lys Ala
                    85                      90                      95
Ala Val Glu Tyr Leu Arg Lys Val Val Glu Lys Gly Lys His Glu Ile
                100                     105                     110
Phe Phe Ile Pro Gly Thr Thr Lys Glu Glu Ala Leu Ser Asn Ile Asp
            115                     120                     125
Gln Ile Ser Asp Lys Ala Glu Glu Leu Lys Arg Ser Thr Ser Asp Ala
        130                     135                     140
Val Gln Asp Asn Asp Asn Asp Asp Ser Ile Pro Thr Ser Ala Glu Phe
145                     150                     155                     160
Pro Pro Gly Ile Ser Pro Thr Glu Asn Trp Val Gly Lys Leu Gln Glu
                165                     170                     175
Lys Ser Gln Lys Ser Lys Leu Gln Ala Pro Ile Tyr Glu Asp Ser Lys
                180                     185                     190
Asn Glu Arg Thr Glu Arg Phe Leu Val Ile Cys Thr Met Cys Asn Gln
                195                     200                     205
Lys Thr Arg Gly Ile Arg Ser Lys Lys Lys Asp Ala Lys Asn Leu Ala
        210                     215                     220
Ala Trp Leu Met Trp Lys Ala Leu Glu Asp Gly Ile Glu Ser Leu Glu
225                     230                     235                     240
Ser Tyr Asp Met Val Asp Val Ile Glu Asn Leu Glu Glu Ala Glu His
                245                     250                     255
Leu Leu Glu Ile Gln Asp Gln Ala Ser Lys Ile Lys Asp Lys His Ser
                260                     265                     270
Ala Leu Ile Asp Ile Leu Ser Asp Lys Lys Arg Phe Ser Asp Tyr Ser
                275                     280                     285
Met Asp Phe Asn Val Leu Ser Val Ser Thr Met Gly Ile His Gln Val
        290                     295                     300
Leu Leu Glu Ile Ser Phe Arg Arg Leu Val Ser Pro Asp Pro Asp Asp
305                     310                     315                     320
Leu Glu Met Gly Ala Glu His Thr Gln Thr Glu Glu Ile Met Lys Ala
                325                     330                     335
Thr Ala Glu Lys Glu Lys Leu Arg Lys Lys Asn Met Pro Asp Ser Gly
                340                     345                     350
Pro Leu Val Phe Ala Gly His Gly Ser Ser Ala Glu Glu Ala Lys Gln
                355                     360                     365
Cys Ala Cys Lys Ser Ala Ile Ile His Phe Asn Thr Tyr Asp Phe Thr
        370                     375                     380
Asp Xaa Lys Tyr Tyr Cys Val Phe Leu Lys Asn Glu Ala Ser Glu Xaa
385                     390                     395                     400
Leu Xaa Lys Lys Lys Lys Lys
                405

<210> 6
<211> 763
<212> PRT
<213> Arabidopsis thaliana

<400> 6
Gly Ile Ile Asn Gly Pro Lys Arg Glu Arg Ser Tyr Lys Val Ala Ile
 1                   5                      10                      15
Lys Phe Val Ala Arg Ala Asn Met His His Leu Gly Glu Phe Leu Ala
                20                      25                      30
Gly Lys Arg Ala Asp Cys Pro Gln Glu Ala Val Gln Ile Leu Asp Ile
            35                      40                      45
Val Leu Arg Glu Leu Ser Val Lys Arg Phe Cys Pro Val Gly Arg Ser
        50                      55                      60
Phe Phe Ser Pro Asp Ile Lys Thr Pro Gln Arg Leu Gly Glu Gly Leu
```

10

```
     65                         70                         75                         80
Glu Ser Trp Cys Gly Phe Tyr Gln Ser Ile Arg Pro Thr Gln Met Gly
                85                         90                         95
Leu Ser Leu Asn Ile Asp Met Ala Ser Ala Ala Phe Ile Glu Pro Leu
               100                        105                        110
Pro Val Ile Glu Phe Val Ala Gln Leu Leu Gly Lys Asp Val Leu Ser
               115                        120                        125
Lys Pro Leu Ser Asp Ser Asp Arg Val Lys Ile Lys Lys Gly Leu Arg
               130                        135                        140
Gly Val Lys Val Glu Val Thr His Arg Ala Asn Val Arg Arg Lys Tyr
145                        150                        155                        160
Arg Val Ala Gly Leu Thr Thr Gln Pro Thr Arg Glu Leu Met Phe Pro
               165                        170                        175
Val Asp Glu Asn Cys Thr Met Lys Ser Val Ile Glu Tyr Phe Gln Glu
               180                        185                        190
Met Tyr Gly Phe Thr Ile Gln His Thr His Leu Pro Cys Leu Gln Val
               195                        200                        205
Gly Asn Gln Lys Lys Ala Ser Tyr Leu Pro Met Glu Ala Cys Lys Ile
               210                        215                        220
Val Glu Gly Gln Arg Tyr Thr Lys Arg Leu Asn Glu Lys Gln Ile Thr
225                        230                        235                        240
Ala Leu Leu Lys Val Thr Cys Gln Arg Ala Glu Gly Gln Arg Asn Asp
               245                        250                        255
Ile Leu Arg Thr Val Gln His Asn Ala Tyr Asp Gln Asp Pro Tyr Ala
               260                        265                        270
Lys Glu Phe Gly Met Asn Ile Ser Glu Lys Leu Ala Ser Val Glu Ala
               275                        280                        285
Arg Ile Leu Pro Ala Pro Trp Leu Lys Tyr His Glu Asn Gly Lys Glu
               290                        295                        300
Lys Asp Cys Leu Pro Gln Val Gly Gln Trp Asn Met Met Asn Lys Lys
305                        310                        315                        320
Met Ile Asn Gly Met Thr Val Ser Arg Trp Ala Cys Val Asn Phe Ser
               325                        330                        335
Arg Ser Val Gln Glu Asn Val Ala Arg Gly Phe Cys Asn Glu Leu Gly
               340                        345                        350
Gln Met Cys Glu Val Ser Gly Met Glu Phe Asn Pro Glu Pro Val Ile
               355                        360                        365
Pro Ile Tyr Ser Ala Arg Pro Asp Gln Val Glu Lys Ala Leu Lys His
               370                        375                        380
Val Tyr His Thr Ser Met Asn Lys Thr Lys Gly Lys Glu Leu Glu Leu
385                        390                        395                        400
Leu Leu Ala Ile Leu Pro Asp Asn Asn Gly Ser Leu Tyr Gly Asp Leu
               405                        410                        415
Lys Arg Ile Cys Glu Thr Glu Leu Gly Leu Ile Ser Gln Cys Cys Leu
               420                        425                        430
Thr Lys His Val Phe Lys Ile Ser Lys Gln Tyr Leu Ala Asp Val Ser
               435                        440                        445
Leu Lys Ile Asn Val Lys Met Gly Gly Arg Asn Thr Val Leu Val Asp
               450                        455                        460
Ala Ile Ser Cys Arg Ile Pro Leu Val Ser Asp Ile Pro Thr Ile Ile
465                        470                        475                        480
Phe Gly Ala Asp Val Thr His Pro Glu Asn Gly Glu Glu Ser Ser Pro
               485                        490                        495
Ser Ile Ala Ala Val Val Ala Ser Gln Asp Trp Pro Glu Val Thr Lys
               500                        505                        510
Tyr Ala Gly Leu Val Cys Ala Gln Ala His Arg Gln Glu Leu Ile Gln
               515                        520                        525
Asp Leu Tyr Lys Thr Trp Gln Asp Pro Val Arg Gly Thr Val Ser Gly
               530                        535                        540
Gly Met Ile Arg Asp Leu Leu Ile Ser Phe Arg Lys Ala Thr Gly Gln
545                        550                        555                        560
```

11

```
Lys Pro Leu Arg Ile Ile Phe Tyr Arg Asp Gly Val Ser Glu Gly Gln
            565                 570                     575
Phe Tyr Gln Val Leu Leu Tyr Glu Leu Asp Ala Ile Arg Lys Ala Cys
            580                 585                 590
Ala Ser Leu Glu Pro Asn Tyr Gln Pro Pro Val Thr Phe Ile Val Val
            595                 600                 605
Gln Lys Arg His His Thr Arg Leu Phe Ala Asn Asn His Arg Asp Lys
    610                 615                 620
Asn Ser Thr Asp Arg Ser Gly Asn Ile Leu Pro Gly Thr Val Val Asp
625                 630                 635                     640
Thr Lys Ile Cys His Pro Thr Glu Phe Asp Phe Tyr Leu Cys Ser His
            645                 650                 655
Ala Gly Ile Gln Gly Thr Ser Arg Pro Ala His Tyr His Val Leu Trp
            660                 665                 670
Asp Glu Asn Asn Phe Thr Ala Asp Gly Ile Gln Ser Leu Thr Asn Asn
            675                 680                 685
Leu Cys Tyr Thr Tyr Ala Arg Cys Thr Arg Ser Val Ser Ile Val Pro
    690                 695                 700
Pro Ala Tyr Tyr Ala His Leu Ala Ala Phe Arg Ala Arg Phe Tyr Leu
705                 710                 715                     720
Glu Pro Glu Ile Met Gln Asp Asn Gly Ser Pro Gly Lys Lys Asn Thr
            725                 730                 735
Lys Thr Thr Thr Val Gly Asp Val Gly Val Lys Pro Leu Pro Ala Leu
            740                 745                 750
Lys Glu Asn Val Lys Arg Val Met Phe Tyr Cys
            755                 760

<210> 7
<211> 678
<212> PRT
<213> Drosophila melanogaster

<400> 7
Arg Ala Gly Glu Asn Ile Glu Ile Lys Ile Lys Ala Val Gly Ser Val
 1               5                   10                  15
Gln Ser Thr Asp Ala Glu Gln Phe Gln Val Leu Asn Leu Ile Leu Arg
            20                  25                  30
Arg Ala Met Glu Gly Leu Asp Leu Lys Leu Val Ser Arg Tyr Tyr Tyr
        35                  40                  45
Asp Pro Gln Ala Lys Ile Asn Leu Glu Asn Phe Arg Met Gln Leu Trp
        50                  55                  60
Pro Gly Tyr Gln Thr Ser Ile Arg Gln His Glu Asn Asp Ile Leu Leu
65                  70                  75                      80
Cys Ser Glu Ile Cys His Lys Val Met Arg Thr Glu Thr Leu Tyr Asn
            85                  90                  95
Ile Leu Ser Asp Ala Ile Arg Asp Ser Asp Asp Tyr Gln Ser Thr Phe
            100                 105                 110
Lys Arg Ala Val Met Gly Met Val Ile Leu Thr Asp Tyr Asn Asn Lys
    115                 120                 125
Thr Tyr Arg Ile Asp Asp Val Asp Phe Gln Ser Thr Pro Leu Cys Lys
    130                 135                 140
Phe Lys Thr Asn Asp Gly Glu Ile Ser Tyr Val Asp Tyr Tyr Lys Lys
145                 150                 155                     160
Arg Tyr Asn Ile Ile Ile Arg Asp Leu Lys Gln Pro Leu Val Met Ser
            165                 170                 175
Arg Pro Thr Asp Lys Asn Ile Arg Gly Gly Asn Asp Gln Ala Ile Met
            180                 185                 190
Ile Ile Pro Glu Leu Ala Arg Ala Thr Gly Met Thr Asp Ala Met Arg
    195                 200                 205
Ala Asp Phe Arg Thr Leu Arg Ala Met Ser Glu His Thr Arg Leu Asn
    210                 215                 220
```

12

```
Pro Asp Arg Arg Ile Glu Arg Leu Arg Met Phe Asn Lys Arg Leu Lys
225             230             235                     240
Ser Cys Lys Gln Ser Val Glu Thr Leu Lys Ser Trp Asn Ile Glu Leu
            245             250                     255
Asp Ser Ala Leu Val Glu Ile Pro Ala Arg Val Leu Pro Pro Glu Lys
            260             265                     270
Ile Leu Phe Gly Asn Gln Lys Ile Phe Val Cys Asp Ala Arg Ala Asp
            275             280             285
Trp Thr Asn Glu Phe Arg Thr Cys Ser Met Phe Lys Asn Val His Ile
    290             295                     300
Asn Arg Trp Tyr Val Ile Thr Pro Ser Arg Asn Leu Arg Glu Thr Gln
305             310                     315                     320
Glu Phe Val Gln Met Cys Ile Arg Thr Ala Ser Ser Met Lys Met Asn
            325             330                     335
Ile Cys Asn Pro Ile Tyr Glu Glu Ile Pro Asp Asp Arg Asn Gly Thr
            340             345                     350
Tyr Ser Gln Ala Ile Asp Asn Ala Ala Ala Asn Asp Pro Gln Ile Val
    355             360                     365
Met Val Val Met Arg Ser Pro Asn Glu Glu Lys Tyr Ser Cys Ile Lys
    370             375                     380
Lys Arg Thr Cys Val Asp Arg Pro Val Pro Ser Gln Val Val Thr Leu
385             390                     395                     400
Lys Val Ile Ala Pro Arg Gln Gln Lys Pro Thr Gly Leu Met Ser Ile
            405             410                     415
Ala Thr Lys Val Val Ile Gln Met Asn Ala Lys Leu Met Gly Ala Pro
            420             425                     430
Trp Gln Val Val Ile Pro Leu His Gly Leu Met Thr Val Gly Phe Asp
    435             440                     445
Val Cys His Ser Pro Lys Asn Lys Asn Lys Ser Tyr Gly Ala Phe Val
    450             455                     460
Ala Thr Met Asp Gln Lys Glu Ser Phe Arg Tyr Phe Ser Thr Val Asn
465             470             475                     480
Glu His Ile Lys Gly Gln Glu Leu Ser Glu Gln Met Ser Val Asn Met
            485             490                     495
Ala Cys Ala Leu Arg Ser Tyr Gln Glu Gln His Arg Ser Leu Pro Glu
            500             505             510
Arg Ile Leu Phe Phe Arg Asp Gly Val Gly Asp Gly Gln Leu Tyr Gln
            515             520             525
Val Val Asn Ser Glu Val Asn Thr Leu Lys Asp Arg Leu Asp Glu Ile
    530             535             540
Tyr Lys Ser Ala Gly Lys Gln Glu Gly Cys Arg Met Thr Phe Ile Ile
545             550             555                     560
Val Ser Lys Arg Ile Asn Ser Arg Tyr Phe Thr Gly His Arg Asn Pro
            565             570                     575
Val Pro Gly Thr Val Val Asp Asp Val Ile Thr Leu Pro Glu Arg Tyr
            580             585             590
Asp Phe Phe Leu Val Ser Gln Ala Val Arg Ile Gly Thr Val Ser Pro
            595             600             605
Thr Ser Tyr Asn Val Ile Ser Asp Asn Met Gly Leu Asn Ala Asp Lys
    610             615                     620
Leu Gln Met Leu Ser Tyr Lys Met Thr His Met Tyr Tyr Asn Tyr Ser
625             630                     635                     640
Gly Thr Ile Arg Val Pro Ala Val Cys His Tyr Ala His Lys Leu Ala
            645             650                     655
Phe Leu Val Ala Glu Ser Ile Asn Arg Ala Pro Ser Ala Gly Leu Gln
            660             665                     670
Asn Gln Leu Tyr Phe Leu
            675
```

13

<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus sequence

<221> VARIANT
<222> <222> 2, 3, 4, 6, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 21,
22, 23, 24, 26, 29, 31, 32, 33, 35, 36, 37, 39, 40,
41, 44, 45, 46, 47, 49, 51, 55, 56, 59, 60, 63, 64,
67, 68

<223> Xaa = Any Amino Acid

<221> VARIANT
<222> 10, 25, 43

<223> Xaa = Any amino Acid if present

<400> 8
Pro Xaa Xaa Xaa Leu Xaa Glu Xaa Xaa Xaa Gln Xaa Xaa Xaa Xaa Xaa
 1   5   10   15
Xaa Xaa Xaa Tyr Xaa Xaa Xaa Xaa Xaa Xaa Gly Pro Xaa His Xaa Xaa
            20   25   30
Xaa Phe Xaa Xaa Xaa Val Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Gly
        35   40   45
Xaa Gly Xaa Ser Lys Lys Xaa Xaa Ala Lys Xaa Xaa Ala Ala Xaa Xaa
    50   55   60
Ala Leu Xaa Xaa Leu
 65

<210> 9
<211> 766
<212> PRT
<213> Caenorhabditis elegans

<400> 9
Ser Ala Val Glu Arg Gln Phe Ser Val Ser Leu Lys Trp Val Gly Gln
 1   5   10   15
Val Ser Leu Ser Thr Leu Glu Asp Ala Met Glu Gly Arg Val Arg Gln
            20   25   30
Val Pro Phe Glu Ala Val Gln Ala Met Asp Val Ile Leu Arg His Leu
        35   40   45
Pro Ser Leu Lys Tyr Thr Pro Val Gly Arg Ser Phe Phe Ser Pro Pro
    50   55   60
Val Pro Asn Ala Ser Gly Val Met Ala Gly Ser Cys Pro Pro Gln Ala
65   70   75   80
Ser Gly Ala Val Ala Gly Gly Ala His Ser Ala Gly Gln Tyr His Ala
            85   90   95
Glu Ser Lys Leu Gly Gly Gly Arg Glu Val Trp Phe Gly Phe His Gln
            100   105   110
Ser Val Arg Pro Ser Gln Trp Lys Met Met Leu Asn Ile Asp Val Ser
            115   120   125
Ala Thr Ala Phe Tyr Arg Ser Met Pro Val Ile Glu Phe Ile Ala Glu
            130   135   140
Val Leu Glu Leu Pro Val Gln Ala Leu Ala Glu Arg Arg Ala Leu Ser
145   150   155   160
Asp Ala Gln Arg Val Lys Phe Thr Lys Glu Ile Arg Gly Leu Lys Ile
                165   170   175
Glu Ile Thr His Cys Gly Gln Met Arg Arg Lys Tyr Arg Val Cys Asn
                180   185   190

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```
Val Thr Arg Arg Pro Ala Gln Thr Gln Thr Phe Pro Leu Gln Leu Glu
        195                 200             205
Thr Gly Gln Thr Ile Glu Cys Thr Val Ala Lys Tyr Phe Tyr Asp Lys
        210             215                 220
Tyr Arg Ile Gln Leu Lys Tyr Pro His Leu Pro Cys Leu Gln Val Gly
225             230                 235                 240
Gln Glu Gln Lys His Thr Tyr Leu Pro Pro Glu Val Cys Asn Ile Val
            245                 250                 255
Pro Gly Gln Arg Cys Ile Lys Lys Leu Thr Asp Val Gln Thr Ser Thr
            260                 265                 270
Met Ile Lys Ala Thr Ala Arg Ser Ala Pro Glu Arg Glu Arg Glu Ile
        275                 280                 285
Ser Asn Leu Val Arg Lys Ala Glu Phe Ser Ala Asp Pro Phe Ala His
    290                 295                 300
Glu Phe Gly Ile Thr Ile Asn Pro Ala Met Thr Glu Val Lys Gly Arg
305             310                 315                 320
Val Leu Ser Ala Pro Lys Leu Leu Tyr Gly Gly Arg Thr Arg Ala Thr
            325                 330                 335
Ala Leu Pro Asn Gln Gly Val Trp Asp Met Arg Gly Lys Gln Phe His
            340                 345                 350
Thr Gly Ile Asp Val Arg Val Trp Ala Ile Ala Cys Phe Ala Gln Gln
        355                 360                 365
Gln His Val Lys Glu Asn Asp Leu Arg Met Phe Thr Asn Gln Leu Gln
    370                 375                 380
Arg Ile Ser Asn Asp Ala Gly Met Pro Ile Val Gly Asn Pro Cys Phe
385             390                 395                 400
Cys Lys Tyr Ala Val Gly Val Glu Gln Val Glu Pro Met Phe Lys Tyr
            405                 410                 415
Leu Lys Gln Asn Tyr Ser Gly Ile Gln Leu Val Val Val Val Leu Pro
            420                 425                 430
Gly Lys Thr Pro Val Tyr Ala Glu Val Lys Arg Val Gly Asp Thr Val
        435                 440                 445
Leu Gly Ile Ala Thr Gln Cys Val Gln Ala Lys Asn Ala Ile Arg Thr
    450                 455                 460
Thr Pro Gln Thr Leu Ser Asn Leu Cys Leu Lys Met Asn Val Lys Leu
465                 470                 475                 480
Gly Gly Val Asn Ser Ile Leu Leu Pro Asn Val Arg Pro Arg Ile Phe
            485                 490                 495
Asn Glu Pro Val Ile Phe Phe Gly Cys Asp Ile Thr His Pro Pro Ala
            500                 505                 510
Gly Asp Ser Arg Lys Pro Ser Ile Ala Ala Val Val Gly Ser Met Asp
    515                 520                 525
Ala His Pro Ser Arg Tyr Ala Ala Thr Val Arg Val Gln Gln His Arg
    530                 535                 540
Gln Glu Ile Ile Ser Asp Leu Thr Tyr Met Val Arg Glu Leu Leu Val
545                 550                 555                 560
Gln Phe Tyr Arg Asn Thr Arg Phe Lys Pro Ala Arg Ile Val Val Tyr
            565                 570                 575
Arg Asp Gly Val Ser Glu Gly Gln Phe Phe Asn Val Leu Gln Tyr Glu
            580                 585                 590
Leu Arg Ala Ile Arg Glu Ala Cys Met Met Leu Glu Arg Gly Tyr Gln
    595                 600                 605
Pro Gly Ile Thr Phe Ile Ala Val Gln Lys Arg His His Thr Arg Leu
    610                 615                 620
Phe Ala Val Asp Lys Lys Asp Gln Val Gly Lys Ala Tyr Asn Ile Pro
625             630                 635                 640
Pro Gly Thr Thr Val Asp Val Gly Ile Thr His Pro Thr Glu Phe Asp
            645                 650                 655
Phe Tyr Leu Cys Ser His Ala Gly Ile Gln Gly Thr Ser Arg Pro Ser
            660                 665                 670
His Tyr His Val Leu Trp Asp Asp Asn Asn Leu Thr Ala Asp Glu Leu
```

Gln Gln Leu Thr Tyr Gln Met Cys His Thr Tyr Val Arg Cys Thr Arg
    690   695   700
Ser Val Ser Ile Pro Ala Pro Ala Tyr Tyr Ala His Leu Val Ala Phe
705   710   715   720
Arg Ala Arg Tyr His Leu Val Asp Arg Glu His Asp Ser Gly Glu Gly
                725   730   735
Ser Gln Pro Ser Gly Thr Ser Glu Asp Thr Thr Leu Ser Asn Met Ala
                740   745   750
Arg Ala Val Gln Val Ile Leu Ala Phe Asn Leu Val Ser Ile
                755   760   765

<210> 10
<211> 737
<212> PRT
<213> Oryctolagus cuniculus

<400> 10
Gly Lys Asp Arg Ile Phe Lys Val Ser Ile Lys Trp Val Ser Cys Val
    1   5   10   15
Ser Leu Gln Ala Leu His Asp Ala Leu Ser Gly Arg Leu Pro Ser Val
                20   25   30
Pro Phe Glu Thr Ile Gln Ala Leu Asp Val Val Met Arg His Leu Pro
            35   40   45
Ser Met Arg Tyr Thr Pro Val Gly Arg Ser Phe Phe Thr Ala Ser Glu
        50   55   60
Gly Cys Ser Asn Pro Leu Gly Gly Gly Arg Glu Val Trp Phe Gly Phe
65   70   75   80
His Gln Ser Val Arg Pro Ser Leu Trp Lys Met Met Leu Asn Ile Asp
                85   90   95
Val Ser Ala Thr Ala Phe Tyr Lys Ala Gln Pro Val Ile Glu Phe Val
            100   105   110
Cys Glu Val Leu Asp Phe Lys Ser Ile Glu Glu Gln Gln Lys Pro Leu
            115   120   125
Thr Asp Ser Gln Arg Val Lys Phe Thr Lys Glu Ile Lys Gly Leu Lys
        130   135   140
Val Glu Ile Thr His Cys Gly Gln Met Lys Arg Lys Tyr Arg Val Cys
145   150   155   160
Asn Val Thr Arg Arg Pro Ala Ser His Gln Thr Phe Pro Leu Gln Gln
                165   170   175
Glu Ser Gly Gln Thr Val Glu Cys Thr Val Ala Gln Tyr Phe Lys Asp
                180   185   190
Arg His Lys Leu Val Leu Arg Tyr Pro His Leu Pro Cys Leu Gln Val
                195   200   205
Gly Gln Glu Gln Lys His Thr Tyr Leu Pro Leu Glu Val Cys Asn Ile
            210   215   220
Val Ala Gly Gln Arg Cys Ile Lys Lys Leu Thr Asp Asn Gln Thr Ser
225   230   235   240
Thr Met Ile Arg Ala Thr Ala Arg Ser Ala Pro Asp Arg Gln Glu Glu
                245   250   255
Ile Ser Lys Leu Met Arg Ser Ala Ser Phe Asn Thr Asp Pro Tyr Val
                260   265   270
Arg Glu Phe Gly Ile Met Val Lys Asp Glu Met Thr Asp Val Thr Gly
            275   280   285
Arg Val Leu Gln Pro Pro Ser Ile Leu Tyr Gly Gly Arg Asn Lys Ala
        290   295   300
Ile Ala Thr Pro Val Gln Gly Val Trp Asp Met Arg Asn Lys Gln Phe
305   310   315   320
His Thr Gly Ile Glu Ile Lys Val Trp Ala Ile Ala Cys Phe Ala Pro
                325   330   335
Gln Arg Gln Cys Thr Glu Val His Leu Lys Ser Phe Thr Glu Gln Leu

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                  340                      345                      350
Arg Lys Ile Ser Arg Asp Ala Gly Met Pro Ile Gln Gly Gln Pro Cys
          355                      360                      365
Phe Cys Lys Tyr Ala Gln Gly Ala Asp Ser Val Gly Pro Met Phe Arg
      370                      375                      380
His Leu Lys Asn Thr Tyr Ala Gly Leu Gln Leu Val Val Val Ile Leu
385                      390                      395                      400
Pro Gly Lys Thr Pro Val Tyr Ala Glu Val Lys Arg Val Gly Asp Thr
                  405                      410                      415
Val Leu Gly Met Ala Thr Gln Cys Val Gln Met Lys Asn Val Gln Arg
              420                      425                      430
Thr Thr Pro Gln Thr Leu Ser Asn Leu Cys Leu Lys Ile Asn Val Lys
          435                      440                      445
Leu Gly Gly Val Asn Asn Ile Leu Leu Pro Gln Gly Arg Pro Pro Val
      450                      455                      460
Phe Gln Gln Pro Val Ile Phe Leu Gly Ala Asp Val Thr His Pro Pro
465                      470                      475                      480
Ala Gly Asp Gly Lys Lys Pro Ser Ile Ala Ala Val Val Gly Ser Met
              485                      490                      495
Asp Ala His Pro Asn Arg Tyr Cys Ala Thr Val Arg Val Gln Gln His
          500                      505                      510
Arg Gln Glu Ile Ile Gln Asp Leu Ala Ala Met Val Arg Glu Leu Leu
      515                      520                      525
Ile Gln Phe Tyr Lys Ser Thr Arg Phe Lys Pro Thr Arg Ile Ile Phe
      530                      535                      540
Tyr Arg Asp Gly Val Ser Glu Gly Gln Phe Gln Gln Val Leu His His
545                      550                      555                      560
Glu Leu Leu Ala Ile Arg Glu Ala Cys Ile Lys Leu Glu Lys Asp Tyr
              565                      570                      575
Gln Pro Gly Ile Thr Phe Ile Val Val Gln Lys Arg His His Thr Arg
              580                      585                      590
Leu Phe Cys Thr Asp Lys Asn Glu Arg Val Gly Lys Ser Gly Asn Ile
          595                      600                      605
Pro Ala Gly Thr Thr Val Asp Thr Lys Ile Thr His Pro Thr Glu Phe
      610                      615                      620
Asp Phe Tyr Leu Cys Ser His Ala Gly Ile Gln Gly Thr Ser Arg Pro
625                      630                      635                      640
Ser His Tyr His Val Leu Trp Asp Asp Asn Arg Phe Ser Ser Asp Glu
              645                      650                      655
Leu Gln Ile Leu Thr Tyr Gln Leu Cys His Thr Tyr Val Arg Cys Thr
              660                      665                      670
Arg Ser Val Ser Ile Pro Ala Pro Ala Tyr Tyr Ala His Leu Val Ala
          675                      680                      685
Phe Arg Ala Arg Tyr His Leu Val Asp Lys Glu His Asp Ser Ala Glu
      690                      695                      700
Gly Ser His Thr Ser Gly Gln Ser Asn Gly Arg Asp His Gln Ala Leu
705                      710                      715                      720
Ala Lys Ala Val Gln Val His Gln Asp Thr Leu Arg Thr Met Tyr Phe
              725                      730                      735
Ala
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<210> 11
<211> 66
<212> PRT
<213> Xenopus laevis

<400> 11
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Pro Val Gly Ser Leu Gln Glu Leu Ala Val Gln Lys Gly Trp Arg Leu
  1               5                      10                      15
Pro Glu Tyr Thr Val Ala Gln Glu Ser Gly Pro Pro His Lys Arg Glu
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                  20                        25                        30
Phe Thr Ile Thr Cys Arg Val Glu Thr Phe Val Glu Thr Gly Ser Gly
            35                        40                        45
Thr Ser Lys Gln Val Ala Lys Arg Val Ala Ala Glu Lys Leu Leu Thr
        50                        55                        60
Lys Phe
 65


<210> 12
<211> 66
<212> PRT
<213> Homo sapiens


<400> 12
Phe Met Glu Glu Leu Asn Thr Tyr Arg Gln Lys Gln Gly Val Val Leu
 1               5                        10                        15
Lys Tyr Gln Glu Leu Pro Asn Ser Gly Pro Pro His Asp Arg Arg Phe
            20                        25                        30
Thr Phe Gln Val Ile Ile Asp Gly Arg Glu Phe Pro Glu Gly Glu Gly
            35                        40                        45
Arg Ser Lys Lys Glu Ala Lys Asn Ala Ala Ala Lys Leu Ala Val Glu
        50                        55                        60
Ile Leu
 65


<210> 13
<211> 818
<212> PRT
<213> Caenorhabditis elegans


<400> 13
Val Asn Glu Glu Ile Lys Val Gln Phe Ala Lys Asn Phe Val Tyr Asp
 1               5                        10                        15
Asn Asn Ser Ile Leu Arg Val Pro Glu Ser Phe His Asp Pro Asn Arg
            20                        25                        30
Phe Glu Gln Ser Leu Glu Val Ala Pro Arg Ile Glu Ala Trp Phe Gly
            35                        40                        45
Ile Tyr Ile Gly Ile Lys Glu Leu Phe Asp Gly Glu Pro Val Leu Asn
        50                        55                        60
Phe Ala Ile Val Asp Lys Leu Phe Tyr Asn Ala Pro Lys Met Ser Leu
 65                      70                        75                        80
Leu Asp Tyr Leu Leu Leu Ile Val Asp Pro Gln Ser Cys Asn Asp Asp
                85                        90                        95
Val Arg Lys Asp Leu Lys Thr Lys Leu Met Ala Gly Lys Met Thr Ile
            100                       105                       110
Arg Gln Ala Ala Arg Pro Arg Ile Arg Gln Leu Leu Glu Asn Leu Lys
        115                       120                       125
Leu Lys Cys Ala Glu Val Trp Asp Asn Glu Met Ser Arg Leu Thr Glu
        130                       135                       140
Arg His Leu Thr Phe Leu Asp Leu Cys Glu Glu Asn Ser Leu Val Tyr
145                       150                       155                       160
Lys Val Thr Gly Lys Ser Asp Arg Gly Arg Asn Ala Lys Lys Tyr Asp
                165                       170                       175
Thr Thr Leu Phe Lys Ile Tyr Glu Glu Asn Lys Lys Phe Ile Glu Phe
            180                       185                       190
Pro His Leu Pro Leu Val Lys Val Lys Ser Gly Ala Lys Glu Tyr Ala
        195                       200                       205
Val Pro Met Glu His Leu Glu Val His Glu Lys Pro Gln Arg Tyr Lys
    210                       215                       220
Asn Arg Ile Asp Leu Val Met Gln Asp Lys Phe Leu Lys Arg Ala Thr
225                       230                       235                       240
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18

```
Arg Lys Pro His Asp Tyr Lys Glu Asn Thr Leu Lys Met Leu Lys Glu
            245             250             255
Leu Asp Phe Ser Ser Glu Glu Leu Asn Phe Val Glu Arg Phe Gly Leu
            260             265             270
Cys Ser Lys Leu Gln Met Ile Glu Cys Pro Gly Lys Val Leu Lys Glu
            275             280             285
Pro Met Leu Val Asn Ser Val Asn Glu Gln Ile Lys Met Thr Pro Val
        290             295             300
Ile Arg Gly Phe Gln Glu Lys Gln Leu Asn Val Val Pro Glu Lys Glu
305             310             315             320
Leu Cys Cys Ala Val Phe Val Val Asn Glu Thr Ala Gly Asn Pro Cys
            325             330             335
Leu Glu Glu Asn Asp Val Val Lys Phe Tyr Thr Glu Leu Ile Gly Gly
            340             345             350
Cys Lys Phe Arg Gly Ile Arg Ile Gly Ala Asn Glu Asn Arg Gly Ala
            355             360             365
Gln Ser Ile Met Tyr Asp Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys
    370             375             380
Asn Cys Thr Leu Asn Thr Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr
385             390             395             400
Glu Ala Lys Asn Met Phe Glu Arg Leu Pro Asp Lys Glu Gln Lys Val
            405             410             415
Leu Met Phe Ile Ile Ile Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe
            420             425             430
Val Lys His Tyr Cys Asp His Thr Ile Gly Val Ala Asn Gln His Ile
            435             440             445
Thr Ser Glu Thr Val Thr Lys Ala Leu Ala Ser Leu Arg His Glu Lys
    450             455             460
Gly Ser Lys Arg Ile Phe Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys
465             470             475             480
Leu Gly Gly Ile Asn Gln Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile
            485             490             495
Ser Pro Glu Glu Lys Glu Arg Arg Lys Thr Met Pro Leu Thr Met Tyr
            500             505             510
Val Gly Ile Asp Val Thr His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr
            515             520             525
Ser Ile Ala Ala Val Val Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr
    530             535             540
Arg Asn Met Ile Val Thr Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala
545             550             555             560
Val Ala His Gly Arg Glu Arg Thr Asp Ile Leu Glu Ala Lys Phe Val
            565             570             575
Lys Leu Leu Arg Glu Phe Ala Glu Asn Asn Asp Asn Arg Ala Pro Ala
            580             585             590
His Ile Val Val Tyr Arg Asp Gly Val Ser Asp Ser Glu Met Leu Arg
            595             600             605
Val Ser His Asp Glu Leu Arg Ser Leu Lys Ser Glu Val Lys Gln Phe
    610             615             620
Met Ser Glu Arg Asp Gly Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile
625             630             635             640
Val Ile Gln Lys Arg His Asn Thr Arg Leu Leu Arg Arg Met Glu Lys
            645             650             655
Asp Lys Pro Val Val Asn Lys Asp Leu Thr Pro Ala Glu Thr Asp Val
            660             665             670
Ala Val Ala Ala Val Lys Gln Trp Glu Glu Asp Met Lys Glu Ser Lys
    675             680             685
Glu Thr Gly Ile Val Asn Pro Ser Ser Gly Thr Thr Val Asp Lys Leu
    690             695             700
Ile Val Ser Lys Tyr Lys Phe Asp Phe Phe Leu Ala Ser His His Gly
705             710             715             720
Val Leu Gly Thr Ser Arg Pro Gly His Tyr Thr Val Met Tyr Asp Asp
```

```
                         725                      730                       735
    Lys Gly Met Ser Gln Asp Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala
                740                      745                 750
    Phe Leu Ser Ala Arg Cys Arg Lys Pro Ile Ser Leu Pro Val Pro Val
                755                      760                 765
    His Tyr Ala His Leu Ser Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr
        770                      775                 780
    Tyr Lys Glu His Tyr Ile Gly Asp Tyr Ala Gln Pro Arg Thr Arg His
    785                      790                 795                      800
    Glu Met Glu His Phe Leu Gln Thr Asn Val Lys Tyr Pro Gly Met Ser
                805                      810                 815

    Phe Ala


    <210> 14
    <211> 63
    <212> PRT
    <213> Caenorhabditis elegans

    <400> 14
    Trp Val Gly Lys Leu Gln Phe Lys Ser Gln Lys Ser Lys Leu Gln Ala
    1               5                   10                  15
    Asp Ile Tyr Glu Asp Ser Lys Asn Glu Arg Thr Glu Phe Thr Leu Val
                20                  25                  30
    Ile Cys Thr Met Cys Asn Gln Lys Thr Arg Gly Ile Thr Ser Lys Gln
            35                  40                  45
    Lys Asp Ala Lys Asn Leu Ala Ala Trp Leu Met Trp Lys Ala Leu
        50                  55                  60
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